AGRICULTURE IN THE PIONEER VALLEY ECONOMY

A Report on Current Status and Future Prospects

Prepared by the
Pioneer Valley Planning Commission June 1987

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June, 1987

Submitted to
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Massachusetts Executive Office of Communities
and Development

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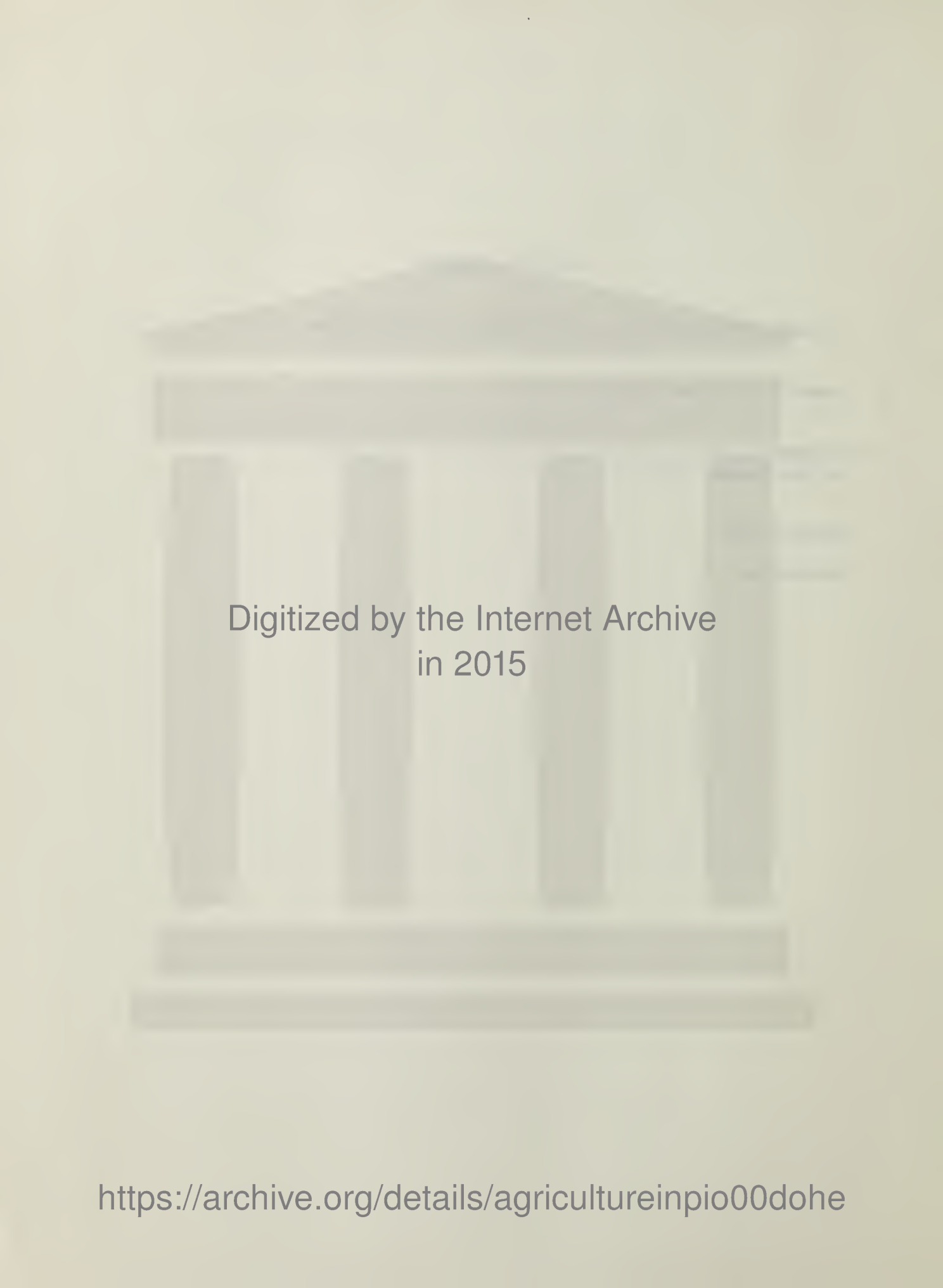

I. ECONOMIC AND JOB TRENDS IN THE PIONEER VALLEY ECONOMY

Introduction

Many Pioneer Valley residents believe that farms are an essential part of their community's fabric and character. They provide open space, local jobs, fresh foods, enhance a community's rural and historic qualities, and generally contribute to the perceived "quality of life". However, farmlands in the Pioneer Valley are today experiencing unprecedented growth pressures. In communities along the Interstate 91 corridor, a rapidly expanding suburban landscape has begun to replace the Valley's scenic and productive open space, its working agricultural landscape. The encroachment of suburban areas into farm areas increases pressures on remaining farmers to sell their land and increases conflicts such as vandalism and nuisance suits which can greatly hinder farm operations. In addition, many farmers each year give up farming and sell their land because they cannot make a decent wage or find an interested successor upon retirement.

The Pioneer Valley Planning Commission believes that successful farmland preservation must address two key issues: preserving prime agricultural lands; and ensuring the long-term economic viability of farm operations. There are many ongoing efforts to preserve farmlands, including the Department of Food and Agriculture's Agricultural Preservation Restriction Program, and the PVPC's work to develop and implement innovative local zoning techniques to create farm districts. The prime intent of this report is to address the role of agriculture in the Pioneer Valley economy and explore strategies to enhance agricultural viability.

The information contained within this report has been compiled from a variety of sources (see attached Bibliography) which have also examined these problems. One such report, co-sponsored by the Pioneer Valley Planning Commission, is appended and represents the Commission's commitment to this objective. It is a summary of "The Role of Agriculture and the Agricultural Products Industry in the Economy of Western Massachusetts" prepared for the Western Massachusetts Economic Development Conference. Our goal in expanding upon those efforts is that this investigation may serve as a prelude to local and state actions which will improve the economic viability of farming within the region.

Demographics of Farm Population

The typical farm operator within the Pioneer Valley Region has lived on his present farm for over 19 years. He is in his early 50's, male, and the farm is an individual or family-run business rather than a corporation or partnership. The chances are very good that farming is not his principal occupation. In fact, of the 951 farms registered in the 1982 census of agriculture (Hampden and Hampshire Counties) only 536 or 56% of the operators listed farming as their principal occupation.

One of the most portentous demographic trends is the present number of farm operators that do not have an interested successor to their operation, while an increasing number of farmers approach retirement age. Based upon a series of land use surveys conducted by the Pioneer Valley Planning Commission (PVPC) for the communities of Amherst, Belchertown and East Longmeadow, 46% of the respondents did not have an interested successor to continue the business after their retirement, 42% did, and 18% were not sure. This fact alone could have dire consequences if land prices continue to skyrocket, since young,

prospective farmers will be competing with developers to purchase land on which to farm. This is already affecting local demographics since young farmers must purchase land in communities where they can afford to buy. This might explain why the average age of farmers in Franklin County (49.7), where land is cheaper, is lower than that of Hampshire and Hampden Counties (53.9) where land is more expensive.

Farm Income and Debt Trends

The most recent state agricultural census (1982) reveals that average per farm sales for Hampshire and Hampden Counties were $42,655. It is important to realize that this figure represents gross income and does not account for the high production expenses incurred by farmers. The value of machinery and equipment alone averages to $27,937 per farm and requires constant maintenance and replacement, not to mention pesticide, fertilizer, feed, seed, veterinary and labor costs. In the event that these expenses cannot be met without borrowing, farmers must obtain loans from either local lenders or one of the major farm lending institutions. The Farmer's Home Administration (FmHA) and the Farm Credit System (the largest institutional farm lender) are two that serve the nation as well as the region.

Only 20% of the region's farmers borrow from major farm lending institutions and foreclosures are quite rare due to smaller farm size, crop diversity, off-farm income and high land prices. Borrowing during the last three years has remained at a consistent level with none of the major farm expansions that were typical of the late 1970's. Farmers are cautious and prudent in their purchases and have been in the top 25% nationwide for repayment of loans. One important reason for this excellent record is that land values are so high in southern New England that real estate sales of even small acreages can provide funds for repayment.

Of the approximately 1,500 farms in the Connecticut River Valley, only 223 farmers borrow from either FmHA or the Farm Credit System. The FmHA in 1984 served 74 Connecticut River Valley borrowers, 50% of whom were dairy farmers, 30% farmed field crops or vegetables, and 20% raised greenhouse or nursery crops. FmHA no longer funds beginning dairy operations as they are considered unsound. The rate of foreclosure in the region has been 1.3% of total borrowers versus a national average of 3%. One of the primary eligibility requirements for an FmHA loan is that the borrower be unable to obtain sufficient credit elsewhere at reasonable rates and terms to finance actual needs.

The Farm Credit System (for commercial farms of a certain size and income) had 149 loans out locally in 1984. 44% of these were to dairy farmers, primarily to cover operating expenses. The following table summarizes the average Farm Credit System borrower in the Commonwealth and the nation:

	Massachusetts	United States
Age	41	45
Farm Income	$38,428	$49,406
Non-Farm Income	31,875	28,289
% w/Non-Farm Income	77%	75%
Acreage Farmed	220	1,004
Debt-to-Asset Ratio	22% (Northeast)	32%

Employment Base

The Pioneer Valley Planning Commission farmer economic survey results indicate that the costs and availability of labor is one of the greatest concerns to farmers. Local farms are having a particularly difficult time recruiting young people for seasonal work. Many farmers feel that they are losing out to fast food restaurants and retail businesses that can pay higher wages. According to the 1982 Census of Agriculture, the number of farms with hired farm labor has remained relatively constant within the region since 1978, yet the total number of workers has declined by 37%. Total payroll has also declined but only by 23%. When viewed relative to these figures (even after accounting for inflation), it is apparent that farmers are spending more money on less labor and still having difficulties hiring. Farmers in the region have increasingly looked to migrant workers to fill the employment gap but face difficulties in locating sufficient housing.

The labor situation was so desparate during the 1986 season that some farmers literally had crops rotting in their fields for lack of labor force to pick them. Thirteen of the area's farmers banded together to form a corporation in time for the 1987 season; they rented dormatories at a labor camp previously owned by Consolidated Cigar Company in Hatfield. The facility houses 90 professional farm workers from Puerto Rico on a seasonal basis at no cost to the workers, although they are responsible for their own food and supplies. The farmers provide transportation to and from the fields.

The farmers have been extremely satisfied by their investment. The workers are reliable, excellent help that allow the farmers to plant increasingly large and more labor intensive crops that bring a higher price in the markets. The problem now facing the farmers is expansion, since 20 more farmers would like to join the program but the existing dorm space cannot house enough additional workers to meet demand.

Changes in Farm Types: Size, Crop Type, Land Values

Size: One of the most significant changes the local farm sector is experiencing is the decreasing size of farms. From 1974 to 1982 the Pioneer Valley Region saw an increase in the number of farms that amounted to 18.0%, yet the total land in farms increased by only 0.4%. The result was a 14.9% decline in the size of the average farm. Thus, there is an increase in the total number of acres being farmed in the region, but the operations are smaller and probably represent more part-time farms.

Crop Type: The statistics on crop types as well as sales by commodity group for the region are summarized in the appendix. Crops that have shown the largest increase (greater than 50%) in sales are grains, vegetables and melons, fruits, nuts, berries, and livestock and their products. The only crop to show a decrease in sales was tobacco. Dairy farming was particularly productive with a 73.9% increase in sales despite a 4.9% decline in the number of farms. These figures do not reflect the impact of the 1985 Dairy Termination Program.

Land Value: The value of land and buildings owned by farmers is also summarized in Table #2, with a net increase of 59.6% per farm and 122.1% per acre. As a result of skyrocketing land values, the most profitable farms are those that produce subdivisions, but the increases are not just limited to

developable lands. Lands participating in the Agricultural Preservation Restriction Program (APR) which are then re-sold have been selling at 25-50% above appraised agricultural values. This indicates a strong demand for farmland to farm as well as for building sites.

Affect of Federal Programs

The federal program which has had the most impact on the region has been the Dairy Termination Program (DTP), otherwise known as the 'Whole Herd Buy-Out' of dairy farms. The program provides cash incentives to dairy farmers willing to slaughter their cows and withdraw from dairy production for a minimum of five years. The objective of the program is to reduce the nation's dairy surplus. The farms that have participated in the program have primarily been large, highly successful farms that viewed the opportunity as a sound business move. Smaller farms that are family-operated viewed the program as a complete change in lifestyle and were more hesitant to participate. Yet some of the larger farms that did participate are actually still in production since dairy employees can continue the business by buying new cows and using the facilities as long as the owner isn't an investor. Locally, dairy farmers that have remained in business view the program as an added expense to their own operation since a portion of their revenues must go to support the buy-out of other farms.

Influence of Technology in Agriculture

Technology within the food products industry has been changing rapidly ever since the advent of biotechnology and the ever increasing advances in polymer science which allow for innovative packaging techniques. These changes are of particular interest to the Western Massachusetts agricultural industry due to the proximity to the University of Massachusetts at Amherst, a leader in the field of polymer science and a valuable resource for innovative agricultural techniques.

One of the most innovative local farm operations is the Nourse farm located in Whately, Massachusetts. The farm is primarily a nursery which markets to both commercial growers and home gardeners. Their specialty is an advanced tissue culture program for the production of strawberries, rasberries and blackberries along with innovative propagation techniques for asparagus, rhubarb, horseradish and evergreens. The farm's testing techniques begin with virus indexing to insure that any plant used as foundation stock is virus and disease free. Heat treatment is also conducted to further insure virus-free stock plants. As the Nourses describe it, "tissue culture is basically a means of producing whole plants from pieces of plant tissue. The farm produces plants from the foundation material obtained from individually virus indexed stock plants. The propagated plants are the most virus and disease free plants available today."

Present agricultural advances as well as local applications are described in detail within the appended report "The Role of Agriculture and the Agricultural Products Industry in the Economy of Western Massachusetts". One conclusion from that report is that based on current trends in consumption, the following food-related industries should be pursued locally:

1. organically-grown and specialty produce
2. specialty food products

3. agriculturally-oriented biotechnology
4. innovative food packaging companies
5. food processing machinery companies

With these opportunities the Pioneer Valley could move to the forefront in innovative agricultural techniques. This is yet one more reason for preserving the already valuable agricultural resource of the region.

II. SUMMARY OF FARMER SURVEYS

In order to obtain more detailed information about the local farm situation the Pioneer Valley Planning Commission conducted a farmer economic survey (see appendix) which was mailed to over 100 area farmers. Despite the fact that the survey was conducted in the spring, one of the busiest times for farmers, the Commission received a 28% response rate. This can only be explained by the fact that farmers considered it to be in their best interest to respond. They believe that the types of questions asked might lead to improvements in maintaining the profitability of the local agricultural industry.

Their responses to the following survey questions are tabulated listing totals for a variety of data such as crop types and acreages. One fact not easily represented by these tables is that the vast majority of local farmers produce a wide variety of crops and livestock; very few depend entirely on one product. The farmers that did respond farm primarily fruit, vegetables or dairy products but diversify their operations to include maple syrup, livestock, nursery products, firewood, hay and grains.

Q. What kind of farming do you participate in and how many acres of each?

A.

Crop Type	Acreage
Grains	277
Tobacco	20
Hay and Pasture	1,965
Vegetables	220
Fruits	268
Nursery	13.2
Other Crops (primarily maple syrup & firewood)	348
Poultry & Products	18

Livestock Type	# of Head
Dairy	420
Cattle	655
Hogs	1100
Sheep	530

Q. Do you have any idle but potentially productive acreage? If yes, how many acres?

A. Idle Acreage: 223 acres

Q. Is farming your main occupation?

A. Farming as Principal Occupation: 71%

Q. What type of storage, processing or packaging facilities are you presently using?

A. Processing Facilities Presently Used (The following are listed in order of the most common processing facilities used)

1. Packaging
2. Other (maple syrup, dried arrangements, etc.)
3. Milk Processing
4. Freezing/Pressing/Fruit Processing
5. Meat Processing

Q. Are costs and availability of the following a problem? (refer to survey in Appendix) Please rank those of greatest concern to you.

A. Costs and Availability

	# of Farmers Considering It a Problem	# of Farmers Considering Their 1st Priority	2nd	Reduced Priority 3rd & Beyond
1. Labor	20	14	1	5
2. Machinery Parts/ Maintenance	16	4	4	8
3. New Equipment	16	3	4	9
4. Pesticides, Fungicides, etc.	14	2	5	7
5. Fertilizers	10	0	2	8
6. Veterinary Care	5	0	4	1
7. Feeds	3	2	0	1

*NOTE: Some farmers prioritized more than one problem under each priority level.

Q. How many on-farm workers do you employ; please distinguish between family and hired labor force.

A. Employment: 46% of respondents operate family run farms that do not hire outside labor.

54% of respondents hire 126 non-family employees
86% of whom work part time
14% of whom work full time

Q. How and where are your products marketed? Please estimate the percentage of your total income represented by each.

A. Present Marketing Techniques (by # of farmers falling into each income category)

Technique	% of Total Income Derived from Each Technique			
	0-25%	26-50%	51-75%	75-100%
Wholesale Distributor	4	-	3	7
Supermarket	3	1	-	2
Restaurants	-	1	-	-
Schools, Hospitals, Institutions	1	-	-	-
Roadside Stands	6	2	3	1
Farmer's Market	1	-	1	-
Pick Your Own	3	-	-	1
Farmer Cooperative	-	-	1	4
Mail Order	1	-	-	-

Q. What type of storage, processing or packaging facilities would you like to see constructed in the region?

A. Processing Facilities Needed

-- cold storage and markets with coolers for farmer use
-- canning for selling surplus
-- market for hides and pelts

Q. Do you prearrange contracts with buyers?

A. % Prearranged: 29%

Summary of Farm Trends

The preceeding discussion of farm demographics, income and debt, employment base, farm type and other trends are primarily a 'sketch' of what presently is happening to farms in the Pioneer Valley region. At first glance these statistics do not appear to indicate a current crisis. They indicate a mixed bag of positive and negative factors. However, the statistics do reveal some rather ominous trends for the future, if no actions are taken to avert impending problems. In addition, statistics alone do not always portray an accurate picture or tell the entire story. PVPC's interviews with farmers and agricultural experts have been particularly revealing regarding farm problems and concerns. Of particular importance are the following issues:

- the average farmer is nearing retirement age;
- 46% of farmers surveyed locally do not have an interested successor;
- there are few new non-inheriting farmers entering the field due primarily to high land costs and initial investment required for equipment, facilities, etc.;
- suburbanization of lands adjacent to farms is increasing the incidence of vandalism or damage to farm property or crops, and harrassment of farmers on nuisance complaints;
- increasing land prices make development an almost irresistible option for some farmers;
- the size of the average farm is decreasing;
- an increasing percentage of local farmers are part-time, depending upon other employment for a portion of income;
- local farms not producing 'at capacity' (average farm from PVPC survey has 8 acres of potentially productive but idle acreage) likely due to lack of storage and processing facilities;

- labor shortage problems increasingly plague farmers;
- agricultural processing facilities and support services are becoming increasingly scarce;
- Massachusetts farmers are finding it increasingly difficult to compete against national and international agribusinesses for larger markets.

Each of these factors are slowly eroding the region's farm base; although the impact does not yet appear in census statistics since the increase in smaller part-time farms is 'taking up the slack' left by losses in the region's full-time large commercial farms. Eventually, though, the loss of local farming operations will threaten the 'critical mass' of farms needed to sustain farm support services.

The Interstate 91 corridor which makes the Pioneer Valley's farmland so accessible is increasingly a conduit for growth pressures of a residential, commercial and industrial nature. If the region waits for a crisis to develop, it will be too late to slow the accelerating suburban sprawl that has already begun to replace the Valley's vital agricultural heritage.

The following recommendations have been developed by the Pioneer Valley Planning Commission as a result of input from farmers, agricultural experts and marketers, as well as research done by Commission staff. The surveys conducted by PVPC were an effort to determine what problems the experts, and farmers themselves, recognize and to encourage their suggestions for possible solutions. PVPC hopes to act as the lead agency in implementing these recommendations, thereby helping to coordinate solutions to some of the problems that have already been reviewed. The PVPC may seek technical support from organizations such as:

- o Pioneer Valley Growers Association
- o Northern Tier Project/Western Mass. Food Industry Council
- o Resource Conservation and Development District
- o Cooperative Extension Service
- o Agricultural Stabilization and Conservation Service

In addition, the following organizations could help to coordinate educational/ public awareness activities.

- o Hitchcock Center for the Environment
- o Mass. Audubon Society
- o Springfield Science Center

III. RECOMMENDATIONS FOR IMPROVING AGRICULTURAL VIABILITY IN THE PIONEER VALLEY

Recommendation #1

COORDINATE A FARMER/BUYER WORKSHOP ON SALE OF LOCALLY-GROWN PRODUCE

Goal: To overcome barriers to increased direct sales of locally-grown produce, and increase cooperation and coordination between Pioneer Valley growers and institutional or smaller-scale buyers.

Response to PVPC's "Agricultural Economic Survey" indicated that half of the 28 farmers responding were interested in participating in a workshop for both farmers and buyers, designed to improve sales of local farm products to local

markets. The farmers who stated they were not interested were all in dairy operations - indicating a strong need for such a workshop targetting vegetable, fruit and livestock farmers. The preferred timing for such a workshop, based on survey responses, is during the off season winter months such as January or February.

In addition to support from farmers, the Pioneer Valley Planning Commission solicited and obtained support from buyers and agricultural experts including the Small Farm Resource Center, the Center for Rural Massachusetts, Pioneer Valley Growers Association, State Line Snacks, and local supermarkets. Both farmers and buyers expressed enthusiasm and commented that such a workshop has been "long overdue".

A possible agenda could include information on market demand, direct sales, production of specialty items (both fresh and processed) and might also provide a discussion of present barriers to buying and selling locally. In this way both growers and marketers could solict ideas and recommendations which could improve sales, profits and eventually help the local agricultural economy. They might also increase the number of pre-arranged contracts between buyers and growers, presently only 29% of those surveyed are already doing this.

Recommendation #2

INCREASE STATE INSTITUTIONAL PURCHASING OF LOCALLY-GROWN PRODUCE

Goal: To determine the extent of present obstacles to increased institutional buying of local produce, and to facilitate improvements which would overcome these marketing constraints.

On September 6, 1982 a Governor's Executive Order was issued specifying that the Executive Office of Administration and Finance (EOAF) in conjunction with the Department of Food and Agriculture would work to overcome some of the problems which limit the amount of in-state produce that is sold to Massachusetts' institutions. PVPC could locate no one at EOAF that could describe their administrative efforts in response to this order.

A representative from the State Purchase Office responsible for potato purchasing for Massachusetts institutions described the present purchasing format as a bidding process where the low bidder gets a contract. Local growers may have an advantage in competing for these contracts because even if they are not the 'low bidder' they may qualify for funds through the Massachusetts Small Business Set-Aside Program which can supplement their bids. This program should be investigated further to determine how often local growers participate and if they are aware that they are eligible.

The state purchasing agent also noted that large quantities of canned, peeled, frozen, and dried potatoes are bought from out-of-state suppliers. This indicates that an in-state potato processing facility could increase marketing options for local farmers.

Other types of produce are purchased separately by each institutional purchasing agent. Further investigation might also include determining whether each agent is striving to purchase in-state produce, whether they need assistance locating appropriate sources and whether incentive or enforcement programs could be initiated to encourage in-state buying.

Recommendation #3

PROMOTE CONSTRUCTION OF LOCAL FRUIT/BERRY PROCESSING FACILITY

Goal: Absorb surplus crop, extend marketing season and allow for increased productive use of acreage, especially with berry crops.

Jams and jellies from the local area are presently not available in farm stands or grocery stores. There are only a few very small cottage industries locally that process fruits (other than apple cider) yet some farmers have begun to grow berries on acreage that was once strung with tobacco netting. Today those berries line picnic tables and fruit stands on many roads and 'pick-your-own' is becoming a local tradition. Unfortunately, while profits from road side and 'pick-your-own' are good, a portion of every crop is wasted that could easily be processed.

Cooperative Extension at the University of Massachusetts could help organize local growers and the Division of Economic Development could provide Technical Assistance for this type of proposal. The option is one requiring further investigation but might provide additional markets, increased profits, and an extended marketing season to valley farmers.

Recommendation #4

PROMOTE CONSTRUCTION OF A REGIONAL CONTROLLED ATMOSPHERE STORAGE AND PACKING FACILITY

Goal: Increase market value of local crops by grading, packing, and extending the market season through cold storage.

A better price could be received by local farmers if their products were sold ready for retail rather than shipped in bulk to a packing warehouse. Small farmers often cannot afford this additional value-added-step but a regional packing facility, operated perhaps under the auspices of PVGA would create a product that would bring a higher price. One facility could be open to many growers to buy, store, pack and market from smaller-scale growers who can't afford such facilities individually. It might also allow for cold storage which could be used for potatoes, onions, apples and a number of other vegetables. Presently markets do exist for these products and could easily be expanded; State Line snacks in Wilbraham buys only 25% locally, primarily because they require an eight month supply of graded potatoes (approximately 15 million pounds). Supermarkets are interested in potatoes also, but they require that they be graded and packaged in the ten pound 'easy carry' bags. According to the Pioneer Valley Growers Association, a grading, packing and storage facility would allow them to significantly increase marketing of produce such as potatoes, onions, carrots and squash. Several examples of cooperative facilities exist in New England, such as the successful cooperative apple storage facility operating in Shoreham, Vermont. The present lack of storage facilities limits the number of acres that can be planted, encouraging idle acreage, as well as limiting market season and therefore value.

Recommendation #5

INVESTIGATE SUBSIDIZED AND ALTERNATIVE HOUSING FOR MIGRANT FARM WORKERS AND POSSIBLE EXPANSION OF THE LOCAL FARM LABOR POOL

Goal: To improve the farm labor situation by drawing farm workers to the region and increasing the local labor pool.

Farm labor is a scarce commodity throughout the country, and the Pioneer Valley is no exception. As previously discussed, the local labor situation was so bad in 1986 that a group of farmers banded together to rent dorm facilities in which to house migrant workers from Puerto Rico. The problem now facing those farmers is demand; twenty more farmers would like to participate but the dorm space would have to be expanded to allow for this. If they were to purchase the lands that they are presently renting it would cost them approximately $400,000 but would allow them to construct additional dormitories, encourage additional participants, and maintain a steady labor pool.

One subsidized housing possibility could be to purchase the land and construct the additional dormitory space using a low-interest loan from the Farmer's Home Administration Program. FmHA can also provide subsidized 1% interest loans to farmers who want to construct on-site housing (single-family or duplex) for one or two key farm staff people. This would make housing available for permanent staff at an affordable rental rate and eliminate transportation costs.

These programs are being used but not at capacity, probably because few farmers can presently afford the capital and long-range planning needed to construct housing for their help. A cooperative effort and assistance with planning tasks could allow farmers to take advantage of these and other alternative housing programs. One such alternative might be to house summer employees in University of Massachusetts fraternities or sororities. That space was rented to the Consolidated Cigar Company in the past, but the option could be viable for a farmer cooperative as well.

The PVPC also recommends that a more detailed examination of the local labor pool be conducted. There may be populations within urban areas of the region that would be interested in farm work but lack the transportation to and from the fields. If this is the case, some type of cooperative transportation could be developed which would serve local farming interests while at the same time improving employment opportunities within the urban sector.

Recommendation #6

IMPLEMENT A SERIES OF PUBLIC EDUCATION PUBLICATIONS AND WORKSHOPS

Goal: To educate the public regarding the problems faced by local farms as well as encourage more active participation in agricultural issues.

Programs could be aimed at educating children of various ages about issues such as where different types of foods come from and how they are produced. Local farm tours could be arranged through school or local environmental institution workshops where children could sample products and observe farming or processing techniques. School programs, with two different angles, should be carried out to increase the awareness of students, and parents via students, of the value of farmlands and of the unique problems which farmers face today. (1) Urban students, especially younger grades, would visit farms to learn what crops are grown nearby and what is involved in production, possibly picking vegetables, apples, watching milking. (2) Students living in farming communities would meet with farmers to learn how farm is run as a

business and difficulties they face. An important goal of such visits would be to minimize problems of youths trespassing and vandalism of farm property which were repeatedly mentioned by farmers as problems. The Springfield Science Museum, the Hitchcock Center for the Environment in Amherst, and Mass. Audubon's Laughing Brook Sanctuary in Hqmpden all expressed interest in helping to coordinate such a program.

To facilitate adult education regarding agricultural issues a guidebook could be prepared for area newspapers, television and radio stations containing listings of various topics and activities (i.e., shearing fleece, grafting trees, calfing). A calendar delineating when certain processes occur during the year, and who to contact for more information about specific subjects, could also be produced.

PVPC, with assistance from the Cooperative Extension Service and the Pioneer Valley Growers Association (PVGA) could also compile a farm tour map. It could show where different crops are grown in the Pioneer Valley as well as when and where consumers can purchase or pick fresh produce. The map could include brief biographies or histories of the farms and would serve to educate residents and tourists (especially during harvest/fall foliage season) about the region's agricultural activities. It might also help to stimulate increases in direct sales by drawing consumers to the fields. To encourage tourism maps could be distributed through Chambers of Commerce as well as at local libraries and businesses.

Conclusion

The Pioneer Valley Planning Commission firmly believes that a successful farmland preservation effort must encompass more than recommendations; it must also include actions. The preceding recommendations outline some of the steps which can be taken to improve the economic viability of farming within the region, but without funding, few of these actions will ever be implemented. The staff of the Pioneer Valley Planning Commission appreciates the support already received from the Executive Office of Communities and Development and the other agencies that offered both information and advice. PVPC anticipates that further efforts will insure the future productivity and viability of farming in Western Massachusetts.

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AGRICULTURAL ECONOMICS STUDY

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9. Ina Mahoney, State Purchasing Agent, Executive Office of Administration and Finance

10. Dick McIntyre, Amherst Office of Agricultural Stabilization and Conservation Service

11. Beverly Cowdrich, Hitchcock Center for the Environment, Amherst

12. Jane McNulty, School Program Coordinator, Mass. Audubon Laughing Brook Sanctuary, Hampden

13. Gloria Keeney, Education Programs, Springfield Science Center, Springfield

14. Don Gregory, State Line Snacks, Wilbraham, MA

15. Allan Sanderson, farmer and coordinator of farm labor housing in Hatfield

16. Karen Houschild, Hampden County Cooperative Extension Service

Appendices

AGRICULTURE (PIONEER VALLEY REGION)

	1974	1978	1982	DIFFERENCE 1974 - 1982 NUMBER	PERCENTAGE
FARMS AND LAND IN FARMS					
FARMS	806	860	951	145	18.0%
LAND IN FARMS	107,014	104,627	107,459	445	0.4%
AVERAGE SIZE	133	122	113	(20)	-14.9%
APPROXIMATE LAND AREA	734,169	734,169	734,169	0	
PROPORTION IN FARMS	14.6%	14.3%	14.6%	0.1%	0.1%
VALUE OF LAND AND BUILDINGS					
PER FARM	$211,306	$299,822	$337,234	$125,928	59.6%
PER ACRE	$1,584	$2,471	$3,518	$1,934	122.1%
TOTAL CROPLAND					
FARMS	777	827	877	100	12.9%
ACRES	52,130	52,327	53,092	962	1.8%
HARVESTED CROPLAND					
FARMS	757	792	831	74	9.8%
ACRES	36,888	37,957	39,554	2,666	7.2%
SALES BY COMMODITY GROUP					
CROPS(INC. NUR. & GRNHSE. PRO.)					
FARMS	627	551	552	(75)	-12.0%
SALES	$17,951,000	$18,643,000	$18,666,000	715,000	4.0%
GRAINS					
FARMS	24	38	38	14	58.3%
SALES	$178,000	$220,000	$484,000	$306,000	171.9%
COTTON & COTTON SEED					
FARMS	0	0	0	0	
SALES	0	0	0	0	
TOBACCO					
FARMS	35	31	37	2	5.7%
SALES	$6,484,000	$4,291,000	$2,420,000	($4,064,000)	-62.7%
HAY,SILAGE & FIELD SEEDS					
FARMS	118	195	231	113	95.8%
SALES	$682,000	N/A	$818,000	$136,000	19.9%
VEG.,SWEET CORN & MELONS					
FARMS	165	226	207	42	25.5%
SALES	$2,396,000	$3,776,000	$4,799,000	$2,403,000	100.3%
FRUITS,NUTS & BERRIES					
FARMS	95	122	114	19	20.0%
SALES	$1,743,000	$2,517,000	$2,950,000	$1,207,000	69.2%
NURSERY & GREENHOUSE PROD.					
FARMS	97	122	98	1	1.0%
SALES	$3,997,000	$4,843,000	N/A		
OTHER CROPS					
FARMS	N/A	50	46		
SALES	N/A	N/A	N/A		

LIVESTOCK, POULTRY & THEIR PRODUCTS					
FARMS	310	438	511	201	64.8%
SALES	$13,654,000	$17,277,000	$22,388,000	$8,734,000	64.0%
POULTRY & POULTRY PROD.					
FARMS	37	59	74	37	100.0%
SALES	$3,590,000	$3,626,000	$4,320,000	$730,000	20.3%
DAIRY PRODUCTS					
FARMS	205	178	195	(10)	-4.9%
SALES	$8,733,000	$10,946,000	$15,188,000	$6,455,000	73.9%
CATTLE & CALVES					
FARMS	260	326	365	105	40.4%
SALES	$1,017,000	$1,794,000	$2,015,000	$998,000	98.1%
HOGS & PIGS					
FARMS	32	57	56	24	75.0%
SALES	$266,000	$738,000	$500,000	$234,000	88.0%
SHEEP, LAMBS & WOOL					
FARMS	15	33	59	44	293.3%
SALES	$28,000	$65,000	$101,000	$73,000	260.7%
OTHER LIVESTOCK & PRODUCTS					
FARMS	17	67	78	61	358.8%
SALES	$20,000	$107,000	$263,000	$243,000	1215.0%

Source: Compilation of Information from 1974 Census of Agriculture, U.S. Dept. of Commerce
1982 Census of Agriculture, U.S. Dept. of Commerce

Farmer (Economic) Survey

1. What kind of farming do you participate in and how many acres of each?

	Acres
Grains	_____
Tobacco	_____
Hay, Silage & Field Seeds	_____
Vegetables, Sweet Corn & Melons	_____
Fruits, Nuts & Berries	_____
Nursery & Greenhouse Products	_____
Other Crops (specify)_____	
Poultry & Poultry Products	_____
Dairy Products	_____
Cattle & Calves	_____
Hogs & Pigs	_____
Sheep, Lambs and Wool	_____
Other Livestock & Livestock Products	_____

2. Do you have any idle but potentially productive acreage? If yes, how many acres? _____

3. Is farming your main occupation? ____ Yes ____ No

4. How and where are your products marketed? Please estimate the percentage of your total income represented by each:
Circle those markets that you would like to distribute to in the future.

	%
Wholesale Distributor	_____
Direct sale to retail dealer	_____
a. supermarket	_____
b. restaurants	_____
c. schools, hospitals, institutions	_____
d. other	_____
Direct sale to consumer	
a. roadside stand	_____
b. farmer's market	_____
c. pick your own	_____
Farmer cooperative	_____
Other (please explain)_____	

5. Do you have pre-arranged contracts with buyers? ____ Yes ____ No

6. What type of storage, processing or packaging facilities are you presently using? Please explain and give location (town, state).

Meat Processing _____
_____
Freezing _____
_____
Pressing _____
_____
Canning _____
_____
Packaging/Sorting by size, weight, etc. _____
_____
Milk Processing _____
_____

Hydro-cooling _____

_____

Dehydrating _____

_____

Fruit Processing (jams/jellies) _____

_____

Other _____

_____

7. What types of storage, processing or packaging facilities would you like to see constructed within the region? Please explain.

_____

_____

_____

8. How many on-farm workers do you employ?

Family operated No. of Full-time _____ No. of Part-time _____
Hired labor force No. of Full-time _____ No. of Part-time _____
Has your on-farm employment increased or decreased in the past five years? _____

9. Are costs and availability of the following a problem? Please comment and rank those of greatest concern to you. (1= greatest concern, then 2, 3, etc.)

Feeds _____
Labor _____
Fertilizers _____
Pesticides, Fungicides, etc. _____
Machinery parts/Maintenance _____

_____
New Equipment _____
Veterinary care _____
Other _____

_____

10. Has your farm income increased or decreased in the past five years?
____ Increased ____ Decreased

What is your current farm income level:

___$0-5000	___$10,000-20,000	___$30,000-40,000
___$5,000-10,000	___$20,000-30,000	___$40,000-50,000
		___$50,000 or more

11. Would you be interested in attending a workshop for both farmers and buyers, designed to increase/improve sales of local products to local markets.

____ Yes ____ No

If yes, when during the year should this type of workshop be held? _____

_____

12. What type of affect have federal farm programs (such as the whole herd buyout program) had on your business? Please comment: _____

_____

_____

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The Role of Agriculture

and the

Agricultural Products Industry

in the

Economy of Western Massachusetts

prepared for:

Western Massachusetts Economic Development Conference

Spring 1987

The Role of Agriculture and the Agricultural Products Industry in the Economy of Western Massachusetts

Contents

Introduction

This report provides an introduction to the subject of the role of agriculture and the agricultural products industry in the economy of Western Massachusetts. The first section provides an overview of the agricultural sector, noting, among other things, that in 1982 that sector contributed $233 million to the Commonwealth's gross product. The second section reviews the range of agricultural products (from specialty food products, to agriculturally oriented biotechnology companies to processing and packaging concerns) which the area does and might support. The final section describes a proposed University-Industry Partnership designed to provide scientific, technological and economic research assistance to the food and agribusiness industry.

It is anticipated that this report will serve to: a) provide descriptive, background information and b) stimulate discussion and support of the activities described.

This report is a result of the collaboration of individuals serving as a Sub-committee on Agriculture and Forestry of the Western Massachusetts Economic Development Conference (WMEDC). The Conference is an umbrella group of entities concerned with regional economic development in the four counties of Western Massachusetts. It's purpose is two fold:

1. To provide a forum for communication among the multitude of people and organizations in Western Mass. involved in economic development.

2. To provide a vehicle for regional and cooperative action when the need exceeds the scope of a single organization.

The sub-committee on Agriculture and Forestry previously sponsored a report on the Forest Products industry prepared by Derrick Mason of the Wood Industry Project of the Hilltown Community Development Corporation.

This report is the result of the collaboration of a number of individuals, including the following:

- Rick Feldman, CRD Program Director, Massachusetts Cooperative Extension
- John Pontius, Small Farms Specialist, Massachusetts Cooperative Extension
- Michael Kane, Co-ordinator, Northern Tier Project

The Massachusetts Cooperative Extension, at the University of Massachusetts in Amherst, provides educational support for, among other, agricultural producers in Massachusetts based on research and other work done at the University. It is a cooperative program linking the federal, state and local levels. The Northern Tier Project focuses on the economy of the sub-

regions of North Adams, Gardner, Athol and Greenfield. Mt. Auburn Associates prepared a Report dated June 20, 1986 for the Massachusetts Executive Office of Communities and Development and the Northern Tier Strategic Analysis Advisory Committee. Excerpts from that Report, entitled "The Northern Tier Economy: A Strategic Analysis" are contained herein.

Penelope Kim, convener of the sub-committee, has served as compiler and editor of this report. She acknowledges with gratitude the assistance and contributions provided by:

- Aleta DeLisle in the preparation of the report.
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Spring 1987

I. Agriculture in Western Massachusetts: An Overview

By: John Pontius
Cooperative Extension Service
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Introduction

Agriculture in Western Massachusetts has always been and still is an important economic activity. The Connecticut River Valley has excellent agricultural soils allowing the region's agricultural activity to yield millions of dollars worth of farm products. Of the Commonwealth's 48 significant agricultural towns, (towns with at least 2500 acres of farmland or 900 animal units), 29 are in Western Massachusetts.

This report relies on statistics collected by the U.S. Census and by the Massachusetts Department of Food and Agriculture. These statistics will be supplemented by data collected by researchers of the Department of Agriculture and Resource Economics of the University of Massachusetts.

The Farm Picture

Until the early 1970's the number of farms and the amount of farmland was decreasing. Since 1974 there has been an increase of 20 percent in the number of farms in Western Massachusetts (see table 1). The amount of land in agriculture has remained relatively constant since 1974 and thus the average farm size has decreased (from an average of 167 acres in 1974 to an average of 143 acres in 1982). In 1982 farmland accounted for 14 percent of the land in Western Massachusetts.

TABLE 1

LAND IN FARMS IN WESTERN MASSACHUSETTS

County	Number of Farms				Land in Farms (acres)				% land in Farms
	1969	1974	1978	1982	1969	1974	1978	1982	1982
Berkshire	380	305	323	352	80,730	73,110	72,648	73,434	12
Franklin	550	404	457	521	92,285	72,909	80,340	79,412	17
Hampden	367	311	366	392	45,908	42,123	43,432	43,835	11
Hampshire	664	495	493	559	80,851	64,891	61,194	63,624	18
Total:	1,961	1,515	1,639	1,824	299,774	253,033	257,614	260,305	14

Source: 1982 U.S. Census of Agriculture

The total market value of agricultural production in Western Massachusetts in 1982 was estimated to be $79,192,000. Table 2 presents values for both crops and livestock per county. The dairy sector was by far the most important sector of the region's agriculture with a market value of $38,731,000. Vegetable production yielded $6,912,000; nursery production was third with $6,738,000; poultry accounted for $5,759,000; fruit production yielded $5,606,000; and cattle and calf production was sixth with $4,948,000. Hampshire County produced 32 percent of the total market value of agriculture production in the region; Franklin County 27 percent; Berkshire County 21 percent; and Hampden County 20 percent.

TABLE 2

MARKET VALUE OF SALES: WESTERN MASSACHUSETTS FARMS for 1982 (sales in $1,000)

	Berkshire	Franklin	Hampden	Hampshire	Total
Dairy	11,098	12,445	5,143	10,045	38,731
Poultry	1,171	268	858	3,462	5,759
Cattle & Calves	1,307	1,626	642	1,373	4,948
Sheep & Lambs	35	50	25	76	186
Hogs & Pigs	43	33	46	454	576
Other Livestock	198	307	99	180	783
Tobacco	-	74	1,489	931	2,494
Grain	199	113	6	478	796
Hay & Silage	563	565	323	495	1,946
Vegetables	450	1,663	2,634	2,165	6,912
Fruit	430	2,201	1,728	1,247	5,606
Nursery & Greenhouses	1,007	1,334	2,000	2,397	6,738
Other	41	876	579	2,221	3,717
Total:	16,542	21,555	15,572	25,523	79,192

Source: 1982 U.S. Census of Agriculture

Table 3 lists the ten most important vegetable crops in the region by acres of production. By far the most important crop by acreage is potatoes with 4026 acres. Other important vegetable crops are: sweet corn-1972 acres; squash-644 acres; cucumbers-513 acres; head cabbage-466 acres. Hampshire county has 4159 acres in vegetable production; Franklin has 2273 acres; Hampden has 1976; Berkshire has 429 acres.

Tables 4 and 5 list acreages for tree fruit and small fruit. The largest acreages in these two groups are devoted to apples-2910 acres. Franklin and Hampden counties, (999 acres and 893 acres respectively), have the largest acreages of this commodity. The small fruit industry is increasing in size and should become a much more important factor in agriculture in Western Massachusetts in the future.

TABLE 3

THE TEN MOST IMPORTANT VEGETABLE CROPS BY ACREAGE PLANTED IN 1982 IN WESTERN MASSACHUSETTS

	Berkshire	Franklin	Hampden	Hampshire	Total
Potatoes	38	1321	255	2412	4026
Sweet Corn	285	264	707	716	1972
Squash	n.a.	117	103	424	644
Cucumbers	3	209	63	238	513
Head Cabbage	9	126	223	108	466
Carrots	1	16	156	52	225
Pumpkins	44	47	45	40	177
Sweet Peppers	4	22	92	49	167
Tomatoes	5	31	78	25	139
Dry Onions	3	44	20	65	132

Source: 1982 U.S. Census of Agriculture and unpublished data from Department of Agriculture and Resource Economics, University of Massachusetts, Amherst.

TABLE 4

LAND IN TREE FRUIT IN WESTERN MASSACHUSETTS, 1982

	Berkshire	Franklin	Hampden	Hampshire	Total
Apples	293	999	893	725	2,910
Cherries	2	2	4	2	10
Grapes	3	2	8	4	17
Peaches	1	40	47	33	121
Pears	6	3	15	14	38
Plums	-	-	7	-	7
Total:	305	1,046	974	778	3,103

Source: 1982 U.S. Census of Agriculture

TABLE 5

LAND IN SMALL FRUITS IN WESTERN MASSACHUSETTS, 1982

	Berkshire	Franklin	Hampden	Hampshire	Total
Blueberries	n.a.	17	64	29	110
Raspberries	3	14	n.a.	2	19
Strawberries	12	43	94	30	179
Total:	15	74	158	61	308

Source: 1982 U.S. Census of Agriculture

Selected farm expenses are the subject of Table 6. Although a high proportion of farm inputs are imported from other regions of the country, the suppliers of these items are local. Thus the farm sector supports a service industry which supplies the farm sector with inputs. This farm service sector is largely local and critical to the success of our regional agriculture. While feed for livestock is the largest expense category, the second most important expense item is hired farm labor. This item is important not only because it is such a large expense item, but also because, for the most part, hired farm labor is drawn from the local labor force. Thus agriculture employs more than just the farm families of the region. Table 7 shows hired farm labor statistics which indicate that 485 farms employed 1524 people for over 150 days. An additional 4284 people were employed for less than 150 days.

TABLE 6

SELECTED FARM PRODUCTION EXPENSES FOR WESTERN MASSACHUSETTS, 1982, ($1,000)

	Berkshire	Franklin	Hampden	Hampshire	Total
Livestock & Poultry purchased	501	623	450	937	2,511
Feed	4,121	4,669	2,319	5,289	16,398
Seeds	259	367	475	650	1,751
Fertilizer	460	1,070	550	1,306	3,386
Chemicals	96	398	303	605	1,402
Hired Farm Labor	1,064	2,604	2,419	3,379	9,466
Contract Labor	24	84	261	220	589
Custom Work	70	256	98	83	507
Energy & Petroleum Products	1,292	1,703	1,335	2,263	6,593
Interest Expense	815	900	664	1,223	3,602
Total:	8,702	12,674	8,874	15,955	46,205

Source: 1982 U.S. Census of Agriculture

TABLE 7

HIRED FARM LABOR IN WESTERN MASSACHUSETTS, 1982

	Berkshire		Franklin		Hampden		Hampshire	
	Farms	(Workers)	Farms	(Workers)	Farms	(Workers)	Farms	(workers)
Farms With:								
1 workers	32	(32)	99	(99)	34	(34)	33	(33)
2 workers	57	(114)	24	(48)	45	(90)	37	(74)
3-4 workers	48	(162)	83	(288)	31	(106)	80	(299)
5-9 workers	34	(219)	63	(370)	42	(245)	57	(367)
10+ workers	10	(150)	23	(762)	37	(1055)	54	(1261)
Total:	181	(677)	292	(1567)	189	(1530)	261	(2034)
Workers with:								
150+ days worked	103	(277)	145	(438)	85	(334)	149	(475)
under 150 days worked	133	(400)	246	(1129)	157	(1196)	232	(1559)

Source: 1982 U.S. Census of Agriculture

Importance of the Farm Sector

The statistics at hand are all aggregates except for the 1982 Agriculture Census. To attempt to identify the importance of the farm sector on a regional basis rather than on the state level is very hard, as gross regional product is not computed. For this section, state-wide figures will be used and, where appropriate, estimates will be made on the contribution of the farm sector to the region's economy.

Value added (the difference between value of output and value of purchased materials and services) is the best measure of relative importance of an economic sector. It shows the contribution of a sector to gross national product, or gross state product at the state level. About 2.0 percent of Massachusetts' gross state product may be attributable to goods which originated in the farm sector, when marketing and support activities are included. The farm sector contribution to gross state product in 1981 was nearly $1.4 billion (the above and much of the following is from an unpublished report by D.A. Storey, Department of Agriculture and Resource Economics, University of Massachusetts, Amherst).

Value added equals the payments to various production factors. The value added payments of the farm sector create incomes to firms and individuals which are re-spent and generate incomes throughout the sector known as the food and fiber industry. These sector-wide effects are known as multiplier effects. The multiplier effects associated with agriculture are higher than those associated with value added in other industries. One reason for this is that agriculture generates employment and income at three levels: production, service, and basic industry. Some economists suggest that in the more industrialized states the multipliers for agricultural value added may be twice as great as those for manufacturing.

Estimates of value added have been developed for different production activities in the farm sector (Kunz and Purcell, 1981). The total value added for farm sector production in Western Massachusetts in 1982 would have been $46,782,000 (Table 8).

On a national basis, a dollar of value added on a farm in 1982 resulted in a little over $7.00 value added in the total food and fiber system. For Massachusetts and the western region it would be well to take a conservative viewpoint in estimating the contribution of a dollar added value on one of our farms to the region's or state's total food and fiber sector's share of gross product. Reasons for such a conservative perspective include: 1)specialized agricultural support services such as farm supply manufacturing are for the most part located outside of the region; 2) our farm products require relative short transportation hauls before reaching customers; 3) our farm products are more likely to be marketed unprocessed. An offsetting argument is that our farm production is labor intensive and there may well be a higher direct multiplier here in farming than elsewhere in the country.

If conservative assumptions are made, each dollar of value added on a Western Massachusetts farm will contribute, because of multiplier effects, $5.00 value added to the total food and fiber system of Massachusetts. In 1982, our regional agriculture would have been responsible for a contribution of $233,910,000. to the gross product of Massachusetts.

TABLE 8

ESTIMATED VALUE ADDED IN THE FARM SECTOR, WESTERN MASSACHUSETTS, 1982

Production Activity	Value of Production ($1000)	Value Added Factor	Value Added Amount ($1000)
Dairy	$38,731	0.63240	$24,493
Poultry	5,759	0.46966	2,705
Cattle & Calves	4,948	0.59062	2,922
Sheep & Lambs	186	0.54707	102
Hogs & Pigs	576	0.33858	195
Other Livestock	783	0.48648	381
Tobacco	2,494	0.99301	2,477
Grain	796	0.62439	497
Hay & Silage	1,946	0.69692	1,356
Vegetables	6,912	0.60382	4,174
Fruit	5,606	0.94981	5,325
Nursey	6,738	n.a.	n.a.
Other	3,717	0.57973	2,155
Total:	$79,192		$46,782

Source: 1982 U.S. Census of Agriculture
Kunz and Purcell (1981)

Recap and Summary

In Western Massachusetts in 1982 there were 1824 farms holding 14 percent of the land in the region (260,305 acres). In the years between 1974 and 1982 the number of farms in the region increased by 20 percent and accounted for 34 percent of the farms of the Commonwealth. The market value of sales of Western Massachusetts farms totaled $79 million or 28 percent of the total market value of farm products for the state. Accounting for value added, and using a conservative multiplier, the farm sector contributed a total of $233 million to the gross product of Massachusetts.

By value of sales, the most important crops in the region, in descending order, were: dairy ($38 million), vegetables ($7 million), nursery and greenhouse products ($6.7 million), poultry ($5.7 million), and fruit ($5.6 million). In 1981 the Pioneer Valley accounted for 43 percent of the total vegetables and 53 percent of the milk produced in the state.

While feed was the most important expense item of farms in Western Massachusetts in 1982, hired farm labor was the second most important item. The cost of farm labor accounted for over $10 million in direct cash outlays to regional workers. The total number of people employed by Western Massachusetts farms, not including farm family labor, during 1982 was 5808.

The above statistics indicate that agriculture in Western Massachusetts is an important and viable sector of the region's economy. Other statements attesting to its value come from those in the tourist industry who state that farmland adds to the scenic value of the region. Also, efforts on the part of the state's government to keep land in agriculture, (millions of dollars have been spent to purchase development rights to agricultural lands), attest to the desire of the people of Massachusetts to have a continuing agricultural presence.

Economic development is of great importance to the region. However, development should be managed so that it does not erode one of the reasons people are attracted to the region: open and farmed spaces. Indeed economic development can aid the farm sector of the region. One of the major vegetable crops in the region is cucumbers. Cucumber production reflects the demand of a local processing plant's need for cucumbers for pickling. There are opportunities for similar ventures that would process or package or, in someway, support the region's farm sector.

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II. Food Related Industry in the Northern Tier: Overview from a Report on the Northern Tier Economy

By: Mt. Auburn Associates

Introduction

The food-related industries in the Northern Tier include traditional and alternative agriculture; companies in the food products industry; agricultural biotechnology companies; and companies in the food processing machinery and packaging industries. It is extremely difficult to estimate the total number of jobs in these related industries. In 1984, the state reported only 260 jobs in agriculture and forestry and 290 jobs in food processing. As discussed earlier, these numbers are a low estimate of the importance of agriculturally-related products. Though data on the value of the produce sold by the region are scarce, one source estimates that the retail value of the produce grown in Franklin County is between $9 million and $12 million a year.

Despite the fact that rural economics in most parts of the U.S. have been badly hurt by the current conditions of the agricultural sector, Massachusetts and New England farms have been meeting with a fair amount of success. In fact, the number of farms in the New England region actually have been increasing. The success of New England farms is largely tied to their low debt service, their involvement in product diversification, and their marketing techniques, which are primarily oriented towards direct sales to consumers. As one indication of the sector's health, the Springfield Farm Credit Bank is the healthiest financial institution in the U.S. Farm Credit System.

Agriculture in the Northern Tier is primarily composed of orchards, dairy farms, maple sugar producers and vegetable farmers. The Department of Food and Agriculture in the state estimates that there are about 834 agricultural activities in the area (including horticulture, a large part of agriculture in the region). There are at least 6 apple orchards in Franklin County alone.

Efforts in "alternative agriculture," such as natural hydroponic farming, also have proved successful in the region. The Northern Tier's attractiveness as a site for new forms of agricultural production is illustrated by the recent interest of a European company in producing hydroponically-grown Belgian Endives in the Greenfield area.

The rural nature of the region and its quality of life also has attracted a number of companies in the food products industry, particularly in the Greenfield area. This industry is potentially critical in providing added value to locally grown agricultural produce. A good example of such local linkage is Oxford Pickle, which purchases 70% of the cucumbers it needs from

local farmers.

The food product companies in the Northern Tier are focussed mainly in the natural and specialty food markets. These companies range from Tomsun Foods, the largest non-oriented tofu producer in the world, to small cottage industries located in people's homes. Food-related products manufactured in the region include pickles by Oxford Pickles, natural bakery items by Baldwin Hill Bakery, Tempeh hot dogs by Tempeh Works, Jofu, a yogurt like product make by Tomsum, natural snack foods and granola by Energy Food Factory, flavored bean sprouts by a local hydroponic farmer, kefir and eggnog by the New England Country Dairy, Bart's ice cream, goat cheese at Westfield Farm in Hubbardston, Gouda cheese from Smith's Country Cheese in Winchendon, and apple cider from a number of cider mills throughout the Northern Tier.

Although food-related products account for only about 300 jobs in Northern Tier, increased growth is expected. Most of the companies interviewed are involved in producing new products and so are forecasting rapid growth. Energy Food Factory, which is interested in expanding in the Greenfield Industrial Park, has developed an innovative new snack food which has already received a lot of interest from supermarkets. New start-up firms also are being proposed, the most well-known being Earth's Best, a natural baby food company. The job numbers also do not account for the small home-based, food-related products being developed throughout the region.

The third agriculturally-related industry developing in the region is biotechnology. The best known biotechnology company in the region is Nourse Farms, which is on the cutting edge of plant tissue technology. This company has produced a new strain of strawberry plants. In response to the problems in asparagus production in the western part of the state, it currently is working on a strain of asparagus which would be more disease resistant. Ultimate Conception, an agriculturally-oriented biotechnology company involved in animal embryo transfers, is moving to the Greenfield area.

Finally, there are a number of companies in the Northern Tier that are involved in food processing technology and packaging equipment. These companies range from a plastics company that manufactures food containers to Kontro, an Athol-based company that develops machinery for the food processing industry.

Economic Development Potential of Food-Related Industry

Current trends in the U.S. food products industry and a solid base in the Northern Tier make the further development of this industry a good target for economic development. Specific targets for development include:

1. organically-grown and specialty produce

2. specialty food products

3. agriculturally-oriented biotechnology

4. innovative food packaging companies

5. food processing machinery companies

The first major trend affecting the food industry is changing consumer buying habits and demographic trends. The increased number of working women and single family households, the increase in the elderly population, and the maturing of the baby boom generation are having a profound impact on food buying habits. These changes are already evident in changing consumer tastes. Analysts of the food industry consistently note that the major changes in consumer tastes are greater demands for convenience foods, health foods, and ethnic foods. A recent newsletter of the food industry emphasizes the importance of diet and health as the new factors for consumers making food choices. The other major trend in consumer behavior is the rapid rise in eating outside of the home. The result is the food service market--made up of restaurants, lodging places, and institutions --is growing rapidly. One market analysis estimated sales at about $182 billion.

With the new interest in health and freshness and the maturing of the baby boom generation, there has been significant expansion in the "specialty food" industry. Specialty foods were defined in a recent article as "premium products with an emphasis on high quality ingredients, outstanding taste and packaging" (Venture, April 1986). Companies producing these goods generally manufacture in small batches and are able to sell at premium prices.

Until very recently, these products were sold primarily in gourmet food shops. However, with increased demand all major supermarket chains now shelf specialty food products. The industry sold only about $2 billion in 1980, but now has a market estimated at $3.5 billion. A recent study by Frost and Sullivan estimated that the industry will experience a 20% annual growth rate.

The second trend that is affecting the food products industry is rapid technological changes in the food manufacturing process. The most dramatic changes are in food packaging, with much of the innovation in the industry aimed at extending the shelf life of fresh foods. Major companies in the food industry have switched to packaging with plastics. It is expected that plastics will soon become the second most popular packaging material, supplanting glass (Food Engineering, August, 1984). Polymer research aimed at addressing some of the remaining problems in plastic packaging is occurring in many of the major

food companies. Aseptic packaging in particular is growing from a base of zero in 1981 to a projected market of $6 billion in 1990. Other trends in process technology are in the area of food irradiation, computer-based automation, and inspection systems.

Finally, new food products are being developed that are produced through biotechnology techniques. Plant biotechnology involves the use of biological processes to improve the taste, texture, disease resistance, and handling of agricultural products. It is estimated that there are about 75 companies in this emerging field. The most well-known new product to come out of this emerging industry is "VegiSnax" a packaged celery stick which is crisper, brighter and free of tough strings. As another product example, biotechnology is being used to improve cheesemaking through genetically-produced rennin enzymes.

Forecasts on the size of the worldwide market for biotechnology-related agricultural and food processing products and supplies range from $430 million in 1990 to $100 billion in the year 2000 (Prepared Foods, January, 1986). One study predicts the sale of food prepared through biotechnology to reach $94 million in 1989, while another study projects sales of $11 billion by the year 2000. It is estimated that seed produced through manipulating plant cells in tissue culture will be a $190 billion industry in 1990 (High Technology, May, 1986).

The Northern Tier is well positioned to take advantage of many of these trends in the food products industry. The region's most important resource in this region is the Food Science Department at the University of Massachusetts. This department, one of the oldest of its kind in the country, is actively engaged in a wide range of research activities related to new food products and new processing and packaging technologies. Activities of the faculty include research in ultrasonic pasteurization techniques for sanitation and cleaning, immobilized enzyme research useful in cheese-making technology, the development of fat-free potato chips and hot dogs made from fish, the quick cooling of pouched foods, and machine design for food production. The department also has a pilot food processing plant which is open to local companies for testing and evaluation.

The potential of the University in the development of innovative food-related products could increase in the future. The department is currently considering developing a "Food Science and Technology Center" which could provide technical advice to small companies in the food industry, provide facilities for research and development activities, and carry out research and development activities. In addition, the University is proposing another center to focus on agriculturally related biotechnology.

In addition to the presence of the University, there are a number of other reasons for a development strategy to target the

specialty food industry, the technological advances in processing and packaging, and the growing biotechnology industry in the Northern Tier:

. The Greenfield area already contains a number of innovative companies in the specialty food market and biotechnology market that could benefit from trends in the industry. To a large extent the human capital base needed to take advantage of opportunities is already present.

. The Northern Tier's proximity to the Boston market, which exemplifies many of the changing tastes in consumer spending and demographic shifts has never been fully exploited. Bildner and Sons, one of the leading companies in the retailing of specialty foods, and Bread and Circus, another specialty retailer with stores throughout Massachusetts, provide a ready market for new products. The new interest in regional foods among restaurants in Boston also could open up new markets for local farmers.

. The quality of life in the region is important in attracting the type of entrepreneurs involved in this industry and in creating a positive "image" for marketing local products. A number of the existing specialty food companies noted that they were in the region because of its quality of life.

. The new efforts to promote the region's tourist industry could open up new markets for specialty food producers. With increased exposure, particularly from the eastern part of the state, the image of the region as a producer of quality food products could be enhanced. Farmers in the area would also benefit from an increased market for directly selling their produce.

. The region's expertise in the area of plastics and specialized machinery could be adapted to the food industry. The proximity of the Polymer Center at the University of Massachusetts, the growing plastics industry, and the general availability of high skilled labor in the machining trades may open opportunities in the region for getting involved in some of the innovations in these markets. The region's traditional strengths in developing specialized machinery also could be used in developing machinery to meet the needs of the food products companies.

. The Whole Herd Buyout Program sponsored by the U.S. Department of Agriculture has created a number of farms looking for new product markets to enter. This program, which purchased dairy herds to control the price of milk, resulted in the loss of about 10% of the dairy farms in the state and 19% of milk production capacity. The availability of the land and talents of these farmers represents a potential opportunity in the agricultural area.

. The state Department of Food and Agriculture and the

Department of Commerce and Development are actively promoting the development of food-related industries. The Commissioner of Food and Agriculture is very committed to promoting local produce and products. His department has linked farmers with restaurant owners and prepared brochures on food products developed in the state. The Department of Commerce and Development has recently established the Massachusetts Fine Foods and Artisanry Program. This program jointly sponsored with the Department of Food and Agriculture a Massachusetts Fine Food Pavilion at the Cuisine '86 Culinary Expo in Boston. In addition, the program is developing a Fine Foods Association in the state, expects to produce a catalogue of quality products, and will be sponsoring a Massachusetts exhibit at the New York Gourmet Food and Wine show in November. Finally, the Department of Commerce and Development has explored the possibility of establishing a state-sponsored canning facility in Western Massachusetts. These new efforts could be instrumental in providing the support for a more targeted effort in the Northern Tier.

Elements of Success in Food Product Development

There are two potential constraints to the development of food-related products in the region that need to be addressed. First, the industry is extremely competitive. There has been a dramatic rise in the number of new products on the nation's grocery shelves. A 1985 article noted that there were 20 or more new products a week, double the number of a few years ago. A more recent article estimated that 263 new food products and brand extensions were introduced this May alone (New York Times, June 8, 1986). The ability of a retail-oriented food products company to get shelf space basically determines whether or not the company succeeds. As another indicator or rising competitiveness in the industry, the intensity of merger and acquisition activity has risen significantly in the past few years. Between 1948 and 1968, $5 billion was spent on mergers in the industry. In 1984 alone, just two companies accounted for over $5 billion in mergers, and there were 583 acquisitions in the industry. The increased size of industry firms has boosted the level of competition.

As a result of the competitive pressures in the industry, a small manufacturer will have to develop innovative ways to get its products on the shelves or develop specialized niches that the food conglomerates are unlikely to enter. A small food manufacturer recently noted in Food Engineering, "With the food industry becoming increasingly competitive and companies being absorbed by larger food giants, developing new products and innovative methods is our way as a small company not only to survive but to compete effectively as well." Another specialty food producer found that getting shelf space required a "guerilla approach"--the managers needed to go directly to the stores and stock and restock their product.

It is clear that creative marketing and "nichemanship" will

be the key to success in the specialty food markets and in agricultural production. Innovation in the area of packaging technology and process technology may also be able to provide local companies with the competitive edge they need to survive.

The second major constraint in the development of the food products industry is the availability of financing. Risk capital will be needed by start-up enterprises and expansion capital by existing companies to be able to take advantage of new opportunities. These capital needs may pose a problem given the nature of the financial market in the region and the lack of a state financing program able to adequately meet the needs of agriculturally-related industries. Our survey of local bankers found little interest in the food processing industry; a local company wishing to expand has recently been turned down by three local banks. Addressing the financing needs of food product companies may become critical to the success of development efforts.

The success of the region in developing food-related enterprises that are able to survive and grow in this competitive environment lies in forging new relationships among businesses in the agricultural, food products and process technology areas and between the University and local businesses. The public sector can play the key role of catalyst in the development of these new relationships and also provide resources needed to support innovative efforts to promote the region's industry.

III. Directions: A Proposed University-Industry Partnership

Through the Northern Tier Project, a proposal has been formulated to establish a University-Industry Partnership involving the Food and Agribusiness Industry and the Departments of Food Science, Food Engineering and Agricultural and Resource Economics at the University of Amherst, Massachusetts. A Program would be established to provide scientific, technological and economic research assistance to the food and agribusiness industry. An outline of the proposed Center follows:

University-Industry Council

- The following entities/partners will be represented on the Council:

  1. University of Massachusetts: appropriate administrators & deans; participating departments; Small Business Development Center.

  2. Industry: major supermarket chain; a Growers Association; small and medium-sized food processing businesses.

  3. Government: Commissioner of Agriculture; area legislators; state economic development agency or department.

  4. Franklin County Community Development Corporation.

- Function of the Council:

  1. Provide overall direction and policy for the Center.

  2. Develop a mechanism for identifying and soliciting technical assistance projects.

  3. Develop a long-term program plan that would secure an economically viable future for the food and agribusiness industry.

Program

- **Scientific and Technological Assistance to Existing Businesses**

  Through a series of discussions with the industry, a number of immediate and short term needs were identified. A program of on-site consultation, direct technical assistance and applied research will be developed to meet those needs. The program will include, but not be limited to, the

following:

product testing
shelf life studies
production research
nutritional evaluation
packaging systems research
sensory evaluation of products
computer-based technology
residue analysis
waste disposal management
access to pilot plant facilities
new product development research
quality assurance & control studies
radiation analysis

Industry Assessment

To assure the long-term economic viability of the industry, a comprehensive analysis will be undertaken that will identify areas of growth potential for the region's businesses, and determine the long-term scientific and technological needs of companies in the food and agribusiness industry.

The analysis will include:

1. A thorough, strategic market analysis of new and existing product lines to determine: which markets are optimal? What promotion strategy fits the chosen products? What distributional obstacles exist?

2. An investigation of potential market niches in consumer demand that a yet-undeveloped product might respond to.

3. A comprehensive analysis of the region's agricultural base (activity and potential) and its relationship with the industry (i.e.: what linkages now exist? Where do additional opportunities lie?).

Technical Assistance for New Industry Enterprises

As new businesses are started in the region, these companies will require:

1. Assistance in establishing a food technology incubator.

2. Provision of laboratory services for product development, testing and research.

3. Assistance in determining facilities and infrastructure needs for new plants or plant expansion.

Geographical Target Area

Because of strong organizational base and an effective working relationship with the vast majority of food and agribusiness companies in the region, the Northern Tier will be the principal

area of focus.

Servicing this relatively restricted geographical area, at least at the outset, respects the resource capacity of the various University Departments, and offers greater chances for successful program implementation.

Nonetheless, serious consideration will be given to servicing 2 to 3 businesses that lie outside the target region. This would assure a proper balance (with respect to size of business, type of product processed or manufactured, type of production process, etc.) of companies the Center will be working with.

Resources

- **Department of Food Science and Nutrition**

  The research conducted in the Department spans the spectrum from basic to very complex applied product development. The physical facility of the Department is extensive and suited to a variety of research ranging from the study of basic chemical phenomena to biotechnology to product development.

  Specialized facilities of the Department include:

  marine food laboratory
  color laboratory
  pilot plant
  meats laboratory
  packaging laboratory
  thermal processing laboratory
  mutagen screening laboratory
  nutrient data bank
  mass spectrometer laboratory

- **Department of Food Engineering**

  Engineering principles have been applied to food processing for many years but "food engineering" is a new, emerging and separate branch of engineering education and professional practice.

  Specialized facilities of the Department include:

  extruder
  vacuum mixer
  electrodialysis and ultrafiltration modules
  coaxial and capillary rheometers
  scanning spectrophotometer
  freeze drier
  multiple-effect brine-driven evaporator
  spray drier
  process cheese cooker
  countercurrent leaching system
  Instron universal testing machine
  differential scanning calorimeter
  mercury porosimeter
  freeze concentrator
  instruments for physical and chemical analysis

. **Department of Agricultural and Resource Economics**

The mission of the Department of Agricultural and Resource Economics is to create and disseminate knowledge about the application of economics to public and private decision making on issues in Massachusetts regarding agriculture, food marketing, rural development, natural resource use and environmental quality. Faculty expertise lies in the following areas:

the internal organization of the larger agribusiness firm
benefit-cost analysis
economics of the large vs. small processing firms
economics of waste disposal
the legal environment (e.g. food safety and anti-trust laws) and public policy in the food system
consumer issues in the food system
structure and performance of the food system
production economics, econometrics, and forecasting techniques
the economics of food processing and retail distribution

. Franklin County Community Development Corporation

The Franklin County CDC, established in 1978, is a private non-profit community and economic development organization which serves the twenty-six towns of Franklin County. Throughout its history, the CDC has concerned itself with improving the climate for economic development in the region. This has been undertaken through direct financial and technical assistance programs for small business development as well as community economic development planning initiatives targeted at communities or industries which have experienced particular economic problems.

In recent years, a primary focus of the CDC has been the development of alternative employment opportunities for workers displaced by plant closings and layoffs in the machine trades. Through the Machine Trades Action Project, the CDC has developed and implemented a three-prong strategy for revitalizing this industry, which included strategic marketing, technology transfer and innovation, and entrepreneurship development.

These strategies have equal applicability to other important sectors of the region's economy, such as the food industry. For several years the CDC has been greatly involved with the county's burgeoning food industry through its business assistance programs. Through packaging over $2 million in financial assistance for food processing businesses in the country, the CDC has developed a unique understanding of and rapport with the industry and its actors. Over the past three months, working in partnership with the Northern Tier

Project, the CDC has helped initiate the development of a local Food Industry Council that would provide the local food industry with direct access to technical expertise available at the University of Massachusetts to meet their Research and Development needs. The promotion of resources based industries in Franklin County has been a primary goal of the CDC as it has worked to establish a balance between economic growth and the preservation of the region's rural character.

. **The Small Business Development Center**

The Small Business Development Center is a University-based technical assistance program that operates through the School of Management. The S.B.D.C. program provides one-on-one management counselling to small businesses, and education and training through a network of regional centers. The S.B.D.C. has had a very strong relationship with the Northern Tier, with outreach and assistance centers located in Gardner, the Athol/Orange area, Greenfield and North Adams. Services provided by the S.B.D.C. are in the areas of:

Financial planning
Preparing financial proposals
Venture capital formation
Debt financing alternatives
Market research

Potential Research and Technical Assistance Projects

Below are examples of the kind of research and technical assistance projects that could be undertaken within the framework of the proposed program. Final decisions, of course, on any projects will be made by the Council.

1. Perform a design and economic feasibility study of a cooperative facility (such as has been built in Ducktown, TN) for grading, packing, and processing of locally grown crops. Of particular interest will be approaches which lead to minimal processed products of likely value in supermarket and restaurant salad bars.

2. Investigate methods of separation of off-grade food products from glass, paper, cardboard, plastic, or metal containers so the containers may be put in landfills without accompanying large amounts of wet organic materials.

3. Investigate low cost processing methods, including winter storage, which will enable land disposal of food wastes at minimal environmental nuisance while maximizing fertilizer and soil amendment attributes.

4. Investigate cultivation, harvesting, storage, and processing

methods needed for new crops (such as Belgian endive) and/or for achieving dramatic reductions in herbicide use with existing crops.

5. Assist companies in the design, testing, evaluation and market demand for new or modified products.